Deployment in Cloud Computing: The Comparative Study

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ABSTRACT

Although clouds have adopted common communication protocols such as HTTP and SOAP, interoperability, integration, and coordination of all clouds remain a concern. Instead, companies are looking for solutions to deploy an infrastructure that spans multiple instances of public and private clouds. Each of the proposed cloud solutions has its own limitations, management APIs, and development cycles that must be monitored and managed to provide a consistent set. The objective of the article is to answer the question: Is there a platform to deploy, run and manage applications in a multi-cloud environment and to ensure their availability, performance, and optimal use of resources?

KEYWORDS

Approach, Cloud computing, Comparative Analysis, Deployment, MDA, MDE, Models, Solution

INTRODUCTION

Increasing competition between cloud market providers, such as Amazon, Microsoft, Google and Salesforce, where each defends its own incompatible standards and formats (Machado, Hauxheer, & Stiller, 2009) increases the number of proprietary solutions. These cloud providers are unable to predict the geographical distribution of users who consume the services. The same applies to the management of breakdowns that occur. Thus, load coordination and outage management must be automatic and service distribution must adapt to changes in workload.

One of the challenges in the cloud computing paradigm from a software engineering perspective is related to methods, tools and techniques to help developers design, develop, assemble and deploy distributed, large-scale, service-oriented applications that use cloud computing technologies. These are difficult tasks because they are much more complex due to the issues related to the use of heterogeneous cloud platforms.

To satisfy all customer needs (avoid breakdowns, find a cloud provider that is located in all geographical areas, and select a provider that offers the best solution). Different technologies, tools and solutions are trying to deploy applications that span multiple instances of public and private cloud.

Most of the solutions provided to design an application cannot meet all the business requirements of all users. So, each of the solutions for deploying applications on the cloud has its own limitations.

DOI: 10.4018/IJDST.2020010103

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In order to help consumers to find the right solution for them, we propose through this manuscript a comparative study between the most used solutions solution (Mohapatra, Mohanty, Pattanayak, & Hota, 2017). 

First, we will briefly present the literature that will lead to the design of applications for a cloud computing environment. Then we will carry out a comparative study of these works in order to identify the gaps, the insufficiencies, the needs, and the problems and thus to create requirements.

APPLICATION DEPLOYMENT

The first definition of software deployment has been proposed by the Object Management Group (OMG) as part of the specification for the deployment and configuration of distributed component-based applications (OMG D&C) (OMG, 2006). According to this proposal, deployment corresponds to the stage of the application life cycle that follows the acquisition of the software and precedes its execution. In other words, after the macro phases related to the production of the software, deployment is the preliminary step to its exploitation. It includes, in particular the installation, (post-) configuration and activation (i.e. initial start-up) activities of the system to be deployed. The definition of the deployment proposed by OMG D&C refers more precisely to the notion of initial deployment. The characterization framework proposed by (Carzaniga, Rosenblum, & Wolf, 1998) and the software deployment through eight activities:

Availability

The purpose of this activity is to produce installable packages for the system to be deployed. It is therefore divided into two sub-activities:

The Packaging

Which consists of building these packages, starting from the binaries from the development phase but also from a static data set of configuration, i.e. independent of the execution environment of the system to be deployed. In a virtualized context, the packages produced are virtual images. This is the representation of the disk contents of the virtual machine in which it will be instantiated. A virtual image is a logical unit containing an installed and preconfigured version of all the software needed to run the distributed application. The generation of a virtual image, therefore, consists in creating a package resulting from the installation and the static configuration of an operating system, a set of middleware, and binaries and application data. Consequently, in a virtualized environment, the packaging activity at the origin of the generation of virtual images takes over part of the installation phase.

The Publication

Whose objective is to make the packages, resulting from the packaging activity, accessible to customers for installation. It can take various forms, such as the recording of packages within an installation repository, or that of the appliances in the image repository of an IaaS platform in the context of computing in the cloud.

Installation

This activity consists of transferring the packages from the provisioning activity to the application’s execution environment, in compliance with the placement constraints. Each package is then integrated into the operating system on which it was deposited. Subsequently, configuration operations make it possible to inform the parameters of the system to be deployed, the value of which depends on the execution environment. There is also talk of post-configuration operation or dynamic configuration. The implementation of these operations aims to solve the dependencies between components expressed using configuration constraints. Once the post-configuration is complete, the system can be activated.
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